**EXPLAIN CHANGES IN INTEL CORE PROCESSORS**

**(1ST GEN-11TH GEN) AND TYPES**

**OF STORAGE MEDIA**

**LAB # 01**



**Fall 2021**

**CSE102L Computer Programming Lab**

Submitted by: **Ali Asghar**

Registration No. :

Class Section: **C**

“On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work.”

Student Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Submitted to:

**Engr. Abdullah Hamid**

Month Day, Year (e.g. February 17, 2020)

Department of Computer Systems Engineering

University of Engineering and Technology, Peshawar

**Q 1: Explain Changes in Generations of Intel Core Processors.**

**Ans:** Processor contain electronic circuits that cause the processing of data to occur. Processor is also called as the brain of computer. Part of the computer system where the computing is done. This is where the computer programs are executed.

Intel's first Core processors made their debut in 2006. Nowadays They’re available in different models like Core i3, i5, i7, i9, and X, and they bring a new generation to market every 1 to 2 years

**Intel Processor Generations**

Intel processor generations simply have an enhanced feature set and speed compared to previous generations. Let’s discuss each generation separately.

**1st Generation Intel Processors – Nehalem**

Nehalem was the Intel processor micro-architecture which was the successor to the initial Core architecture which had certain limitations like inability to increase the clock speed, inefficient pipeline, etc. Nehalem was released for production in 2010.

Nehalem used the 45-nanometer process as opposed to the 65nm or 90nm used by previous architects. Nehalem reintroduced hyper-threading technology which was left out mainly in the initial Core i3 processor models.

The Nehalem processor has a 64 KB L1 cache, 256 KB per core L2 cache and 4 MB to 12 MB L3 cache which is shared with all the processor cores. It supports 1156 LGA socket and 2-channel DDR3 RAM.

**2nd Generation Intel Processors – Sandy Bridge**

Sandy Bridge micro-architecture was introduced in 2011. Sandy Bridge uses the 32-nanometer process as opposed to 45 nm used in Nehalem. Sandy Bridge processor average performance enhancement as compared to Nehalem was about 11.3%.

Sandy Bridge uses the same 64 KB L1 cache and 256 KB per core for L2 cache but the difference is in the L3 cache. Normally the Sandy Bridge processor L3 cache was from 1MB to 8 MB. For extreme processors, it was from 10 MB to 15 MB. It uses 1155 LGA socket and 2-channel DDR3-1066 RAM.

**3rd Generation Intel Processors – Ivy Bridge**

Introduced in September 2012, Ivy Bridge processors use the 22-nanometer process as opposed to 32 nm used in Sandy Bridge. The only problem with Ivy Bridge processors is that they may emit more heat as compared to Sandy Bridge processors.

Ivy Bridge architecture uses the same 1155 LGA socket with DDR3-1333 to DDR3-1600 RAM.

**4th Generation Intel Processors – Haswell**

Haswell was released by Intel in June 2013. It uses the same 22-nm process as Ivy Bridge. The performance improvement of Haswell as compared to the Ivy Bridge is from 3% to 8%. Haswell carries a lot of features from Ivy Bridge with some very exciting new features like support for new sockets (LGA 1150, BGA 1364, LGA 2011-3), DDR4 technology, a completely new cache design, etc.

The main benefit of Haswell is that it can be used in ultra-portable devices due to its low power consumption.

**5th Generation Intel Processors – Broadwell**

Broadwell was released by Intel in 2015. It uses 14-nm process technology which is 37% smaller in size than its predecessors. According to Intel, with the Broadwell CPU, the device’s battery life could be improved as long as 1.5 hours.

The Broadwell chips also feature faster wake times and improved graphics performance. It supports 1150 LGA sockets with 2-channel DDR3L-1333/1600 RAM.

**6th Generation Intel Processors – Skylake**

Intel introduced Skylake, the 6th generation processors in 2015. Skylake is a redesign of the same 14-nm technology which was introduced in Broadwell, the 5th generation architecture.

**7th Generation Intel Processors – Kaby Lake**

Intel’s 7th generation processors, codenamed Kaby Lake, were introduced in 2016. It uses a 14-nm process architecture.

Kaby Lake introduced a new graphics architecture to improve 3D graphics performance and 4K video playback. It uses 1151 LGA sockets and has dual-channel support for DDR3L-1600 and DDR4-2400 RAM slots.

**8th Generation Intel Processors – Kaby Lake R**

In 2017, Intel introduced a refresh of Kaby Lake processors as their new 8th generation release. The details are the same as mentioned in the 7th Generation Intel Processor but some 8th generation chipsets have support for DDR4-2666 RAM but lack DDR3L RAM support.

**9th Generation Intel Processors – Coffee Lake**

Coffee Lake processors were introduced by Intel in late 2017. With this architecture, Intel Core i9 processors were introduced.

Coffee Lake processors break the limit of 4 cores per CPU. The new processors can now support up to 8 cores per CPU.

Since the heat produced in these cores will be enormous, Intel attached the integrated heat spreader (IHS) to the CPU die instead of the thermal paste which is normally used in earlier processors.

It uses 1151 LGA sockets with altered pinouts to support more than 4 cores along with up to 16 MB of L3 cache.

**10th Generation Intel Processors – Cannon Lake/Ice Lake**

Cannon Lake, Intel’s 10th generation architecture, comes with an all-new 10-nm technology. It was released in late 2017 but production properly started in 2018.

Ice Lake is produced as the 2nd generation of 10-nm processors.

They use BGA1526 sockets and come with DDR4 3200 and LPDDR4X 3733 support. This is the first CPU architecture that comes with integrated support for Wi-Fi 6 (802.11ax) and Thunderbolt 3.

**11th Generation Intel Processors – Tiger Lake**

The 11th generation Intel, Tiger Lake, is yet to be released. They will be the third generation of 10-nm transistor technology. According to Wikipedia, Tiger Lake architecture will have up to 30% performance gains as compared to Ice Lake. L4 cache will be introduced in this generation for further performance boosts.

**Q 2: Explain the history of storage media.**

**Magnetic Storage Types**

**1. Hard Disk Drive**

A hard disk drive (HDD) is a non-volatile storage medium. Non-volatile data remains on a given device unless rewritten or deleted. In hard drives, an electromagnet creates positive or negative charges on the disk surface. The charges create binary code read as the rotating disk and actuator arm work in conjunction.

**Typical Storage Capacity**: 500 GB to 4+ TB

**2. Magnetic Tape Device**.

Data is written onto magnetic tape through various means, which is outside the scope of this description. Tape features higher storage capacities than hard drives, and they’re more reliable than HDDs.

**3. Floppy Disks**

Floppy disks existed as storage devices from 1971 to 1999. The disk drives required to read floppy disks are no longer included in mainstream computers.

Most floppy disks held less than two megabytes of data. Unfortunately, floppy disks maxed out at 240 MB of storage space.

**Flash Storage Types**

**4. SSD (Solid State Drive)**

Solid state drives rely upon NAND flash memory to deliver blistering read/write speeds. Transistors are wired in series on a given circuit board, meaning SSDs lack moving parts. For that reason, data can be accessed immediately and without much noise or heat.

Typically, SSDs cost more money than HDDs with similar storage capacities. They cannot be beaten on read/write speeds or longevity, though.

**5. USB Flash Drive**

Like SSDs, USB Flash Drives rely upon NAND flash memory. These devices are designed to be portable, pocketable storage solutions. Also, a variety of storage capacities are available on the market, although capacities over 256 GB are uncommon.

**Typical Storage Capacity**: 8 GB to 256GB (Maximum 2 TB)

**6. SD Card**

SD Cards rely upon flash memory and are designed for portable devices such as cameras, smartphones etc. Most laptops and many smartphones feature SD Card readers.

SD cards are categorized by their read/write speed, which can vary 12.5 megabytes per second to 3,938 MB/s.

**Typical Storage Capacity**: 2 GB to 32 GB+

**Optical Storage Types**